

ABSTRACT

A fuel cell system including an anode chamber having a fuel mixture comprising methanol and water, and a diffusion layer, a fuel source in fluid communication with the anode chamber via a conduit, a cathode chamber having a cathode and a diffusion layer, wherein the diffusion layer is in fluid communication with an oxidizer, and a proton conducting, electrical non-conducting membrane electrolyte separating the chambers and positioned substantially adjacent to said diffusion layers. The membrane includes a catalyst exposed to each of the chambers for initiating chemical reactions to produce electricity. The system also includes a first valve for automatically controlling a flow of fuel from the fuel supply cartridge, where the first valve includes a shape memory alloy.